B. Tech 3th Semester (Mechanical Engineering)
Lesson Plan: Strength of Materials-I (PCC-ME-302/21)

S. NO	Content to be Covered	Lect. No.
	UNIT-1	
1	**Discussion of CO-PO of SOM** **stress- strain and deformation of solids :**Introduction, stress, strain, types of stresses, hooks law, young's modulus, shear stress, shear modulus	**L-1**
2	Stress -strain curve for elastic and brittle material, factor of safety	**L-2**
3	Analysis of bars of varying section, superposition,	**L-3**
4	Numerical on composite section, free body diagram,	**L-4**
5	Elastic constant and their relationship: Poisson ratio, bulk modulus, volumetric strain, concept of complimentary shear stress.	**L-5**
6	Thermal stresses, thermal stresses in composite bar	**L-6**
7	Principal stresses and principal planes, analytical method for determining the stresses on inclined plane	**L-7**
8	Numerical on principal stress and strain	**L-8**
9	Mohr circle of stresses, numerical solution by Mohr's circle	**L-9**
	UNIT-2	
10	**Transverse Loading on Beams and Stresses in Beams:** shear force and bending moment diagram,types of beams: simply supported, cantilever, overhanging, continuous, fixed beam. types of loading: point load, uniformly distributed load, uniformly varying load, sign convention	**L-10**
11	SFD and BMD for cantilever beam for a point load and numerical	**L-11**
12	SFD and BMD for cantilever beam for a uniformly distributed load and numerical	**L-12**
13	SFD and BMD for simply supported beam for a point load and uniformly distributed load	**L-13**
14	Numerical on SFD and BMD on simply supported beam, overhang, determination of point of contra-flexure	**L-14**
15	SFD and BMD for simply supported beam carrying Uniformly varying load.	**L-15**
16	SFD and BMD diagram subjected to couple, SFD and BMD diagram subjected to inclined load	**L-16**
17	**Bending stresses in beam:** concept of pure bending, Theory of bending of beams with assumption,	**L-17**
18	Bending stresses, neutral axis, moment of resistance, section modulus, bending stresses in different symmetrical section.	**L-18**
19	Numerical on bending stresses	**L-19**
20	**Shear stress distribution in beams**: shear stress in beams,	**L-20**
21	shear stress in different section	**L-21**
22	Numerical on shear stress in different sections.	**L-22**
	UNIT-3	
23	**Deflection of beams**: Introduction, Relation between slope, deflection and radius of curvature, Deflection of beam by double integration: Deflection of simply supported beam carrying a point load at the center	**L-23**

24	Numerical on uniformly distributed load	**L-24**
25	Macaulay's method: deflection of simply supported beam with eccentric point load, uniformly distributed load.	**L-25**
26	Numerical on Macaulay's method	**L-26**
27	Deflection and slope of cantilever beam.	**L-27**
28	Moment Area method for slope and deflection of beam,	**L-28**
29	Castiglaio's theorem, numerical	**L-29**
30	Maxwell theorem, numerical	**L-30**
31	Conjugate beam and strain energy method	**L-31**
	UNIT-4	
32	**Torsion**: derivation of shear stress produced in circular shafts subjected to torsion, torque transmitted by solid shaft, hollow shaft	**L-32**
33	Torque transmitted by stepped shaft, numerical	**L-33**
34	deflection of shaft fixed at both ends, Numerical	**L-34**
35	Helical spring: Types of springs, closed coil and helical spring, Expression for max stress induced in the wire	**L-35**
36	Expression for deflection of spring and stiffness of spring	**L-36**
37	Carriage springs, numerical	**L-37**
	UNIT-5	
38	**Thin Cylinders, Spheres and Thick Cylinders:** Introduction, stresses in thin cylindrical vessels subjected to internal pressure, circumferential stress	**L-38**
39	Efficiency of joints, wire wound thin cylindrical shell, numerical	**L-39**
40	Numerical	**L-40**
41	Thin spherical shells, numerical	**L-41**
42	Stresses in thick cylinders shell	**L-42**
43	Stresses in compound cylinders	**L-43**
44	Numerical	**L-44**
45	Thick spherical shells	**L-45**
46	Numerical	**L-46**

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